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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/535,688

12/28/2005

Marcus-Christian Amann

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11/05/2008

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BOULDER, CO 80301

EXAMINER

NGUYEN, KHIEM D

ART UNIT

PAPER NUMBER

2823

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/535,688	Applicant(s) AMANN, MARCUS-CHRISTIAN	
	Examiner KHIEM D. NGUYEN	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/28/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 1-10 and 23-25) in the reply filed on July 11th, 2008 is acknowledged. According, non-elected claims 11-22 and 26 had been cancelled by the Applicant.

Oath/Declaration

2. The oath/declaration filed on December 28th, 2005 is acceptable.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

4. Claim 6 is objected to because of the following informalities: In claim 6, line 7, please replace "additonal" with --additional--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 8, recited "heating the semi-conductor in a suitable atmosphere". However, it is unclear which semi-conductor is referring to in the

Applicant's claimed invention. Is it the first n-doped semi-conductor layer, the at least one p-doped semi-conductor or the second n-doped semi-conductor layer?

Claim Rejections - 35 USC § 102

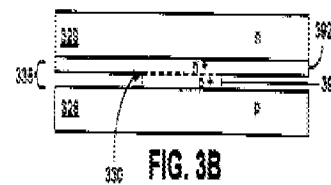
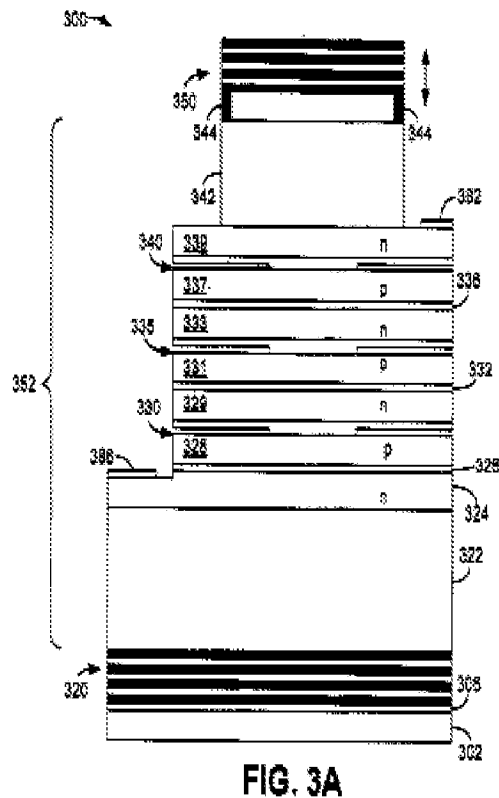
6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-3, 5-9 and 23-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Bour et al. (U.S. Patent 6,771,680).

In re claim 1, **Bour et al.** disclose a method for producing a buried tunnel junction in a surface-emitting semi-conductor laser (VCSEL) having an active zone with a pn-junction surrounded by a first n-doped semi-conductor layer **329** and at least one p-doped semi-conductor layer **328** and having a tunnel junction **330** on the p-side of the active zone, which borders on a second n-doped semi-conductor layer comprising: laterally ablating tunnel junction material by material-selective etching to a desired diameter of the tunnel junction **330**; and heating the semi-conductor in a suitable atmosphere, until an etched gap formed by the ablating procedure is closed by mass transport from at least one semi-conductor layer bordering the tunnel junction (see col. 10, lines 40-67 and FIGS. 3A-B).



In re claim 2, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein at least one of the semi-conductor layers bordering the tunnel junction comprises a phosphide compound (see col. 9, lines 16-34).

In re claim 3, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein the suitable atmosphere comprises a phosphoric atmosphere (see col. 10, lines 40-67).

In re claim 5, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein the method further comprising: starting with an epitaxial initial structure on the surface-emitting semi-conductor laser;

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sequentially applying a p-doped semi-conductor layer **328**, the tunnel junction layer **330** and the second n-doped semi-conductor layer **329** on the p-side of the active zone; and using photolithography and/or etching to form a circular or ellipsoid stamp having flanks enclosing the second n-doped semi-conductor layer **329** and the tunnel junction layer **330** and extending at least to underneath the tunnel junction layer **330** (see col. 9, lines 1-48 and FIG. 3A).

In re claim 6, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein the method further comprising applying an additional semi-conductor layer to the second n-doped semi-conductor layer **329** at the p-side of the active zone, the additional semi-conductor layer bordering a third n-doped semi-conductor layer, wherein the additional semi-conductor layer is laterally ablated to a desired diameter by material-selective etching and subsequently heated in a suitable atmosphere until an etched gap formed by the ablating procedure is closed by mass transport from at least one of the semi-conductor layers bordering the additional semi-conductor layer (see col. 9, lines 1-48 and FIG. 3A).

In re claim 7, as applied to claim 6 above, **Bour et al.** disclose all claimed limitations including the limitation wherein different semi-conductors are used for the additional semi-conductor layer and for the tunnel junctions (see col. 9, lines 1-48 and col. 10, lines 50-56).

In re claim 8, as applied to claim 7 above, **Bour et al.** disclose all claimed limitations including the limitation wherein InGaAsP is used for the additional

semi-conductor layer (see col. 9, lines 16-34) and InGaAs is used for the tunnel junction (see col. 10, lines 50-56).

In re claim 9, as applied to claim 6 above, **Bour et al.** disclose all claimed limitations including the limitation wherein the additional semi-conductor layer is arranged in a maximum of a longitudinal electrical field, while the tunnel junction is in a minimum of the longitudinal electrical field (see col. 9, lines 1-60).

In re claim 23, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein at least one of the semi-conductor layers bordering the tunnel junction comprises InP (see col. 9, line 66 to col. 10, line 5).

In re claim 24, as applied to claim 1 above, **Bour et al.** disclose all claimed limitations including the limitation wherein the suitable atmosphere comprises a mixture of PH₃ and hydrogen (see col. 10, lines 40-67).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4, 10 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bour et al. (U.S. Patent 6,771,680).

In re claims 4, 10 25, as applied to claim 1, Paragraph 7 above, there is no evidence indicating the heating temperature ranges and the etching solution ratio

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is critical and it has been held that it is not inventive to discover the optimum or workable temperature or etching ratio ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHIEM D. NGUYEN whose telephone number is (571)272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kiem D. Nguyen/
Examiner, Art Unit 2823

/K. D. N./
November 04th, 2008